The North Pickering Project

Location & Site Requirements of Secondary Industry

[Background Paper No. 10]

January, 1975

Ministry of Housing
Ontario

This report was prepared as background material in the Planning of The North Pickering Planning Area and does not necessarily constitute a recommendation of the North Pickering Project nor approval of the Government of Ontario.

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LOCATION & SITE REQUIRMENTS OF SECONDARY INDUSTRY

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PART I

LOCATION & SITE REQUIREMENTS OF SECONDARY INDUSTRY

PART I

LOCATION & SITE REQUIREMENTS OF SECONDARY INDUSTRY (Manufacturing, Wholesale and Construction)

INTRODUCTION

Part I of this report describes and summarizes one of the exercises carried out by the North Pickering Project to detail location and site requirements for secondary industry.

Industrial Location Patterns, a North Pickering Project Background Paper contains a general discussion of industrial location patterns and factors. Part II of this report provides The New Manufacturing Establishments Survey Response Analysis. Part III of this report is Location Factors - Literature Review.

The purpose of the questionnaire concerning Location & Site Requirements of Secondary Industry, dealt with in Part I of this report, was to call upon the practical experience of experts in the day-to-day business of locating industrial firms. A consensus on location and site requirements and answers to location-related questions was sought through the medium of this questionnaire.

METHODOLOGY

The questions were drawn up by the Economic Planning staff of the North Pickering Project. The questions posed were expected to result in answers useful as input to the planning process. Prospective recipients of the questionnaire were "sounded out" to obtain their reaction to the idea of the questionnaire. This sounding out process resulted in enthusiastic acceptance

of the idea of the questionnaire.

The questionnaire was mailed to members of the North Pickering Project's Economic Special Interest Group, to members of the Society of Industrial Realtors and to Industrial Development Commissioners, Officers and Clerks in Metropolitan Toronto and the surrounding area. Many complementary copies were sent to interested parties. An accompanying letter requested early return of the questionnaire. One follow-up telephone call was made after the due date to most of those who had not returned the questionnaire.

The answers were tabulated and are presented in the remainder of this report.

The North Pickering Project wishes to express particular thanks to Mr. R. Fear, President of the Society of Industrial Realtors who most kindly arranged for some members of the Society to accept the questionnaire, and to Mr. Wm. A. Willson, General Manager, Metropolitan Toronto Industrial Commission. Mr. Willson provided his answers to the questionnaire in the course of a meeting with a representative of the Economic Planning Staff of the North Pickering Project. During the meeting, he provided a short critique of the questionnaire. Mr. Willson has also commented on the results of the questionnaire. His remarks were valuable in placing these results in a proper perspective.

One hundred and six copies of the questionnaire were made. Twenty-five copies were classified as complementary or no reply expected. Eighty-one responses were expected. Twenty-three completed responses were received. This represents a

twenty-eight percent response rate which is considered "average" for a mailed questionnaire with one follow-up phone call.

GENERAL COMMENTS

A completed "idealized" questionnaire forms the appendix to Part I of this report.

The next section highlights the responses from the questionnaire. However, several general comments on it and the answers received should first be made.

The questionnaire consisted of twenty-three questions. Five required a ranking of location requirements. Ten required yes/no or multiple choice answers. Seven required a quantified answer. The last question asked if there were any problem areas which were missed in the questionnaire.

Comments related to specific questions are contained in the detailed answers section of this report. However, it should be noted that the first five questions were quite difficult For example, question #3 was specific in asking for the essential location requirements of the Dairy Product Industries, but was also too general in that neither the size of the firm nor the actual product was mentioned. Over one third of the respondents left #3 blank. Approximately 20 percent of the respondents answered #3 with "no change". Thus, less than one half of the responses indicated a change. However, no pattern of change in "essential" factors could be determined from the varied answers of this small number of responses. Similar statements apply to question #4.

The questions were drawn up with North Pickering in mind. The questionnaire contained several references either to North Pickering or to planning a new town and, of course, the covering letter stated that the results would be used in planning North Pickering. However, the wording of each question did not contain a specific reference to North Pickering. Consequently, different respondents may have assumed different contexts in replying, e.g. North Pickering, Metropolitan Toronto or hypothetical.

HIGHLIGHTS

The Essential Location Factors are:

Ready access to customers

Ready access to labour

Ready access to municipal services

Ready access to suppliers

Ready access to a highway

Room for expansion

The Most Important Competitive Edge Location Factors are:

Cost of business accommodation

Cost of services (e.g. water, sewage, hydro)

Local tax level

Prestige location

Rail

There will be a significant increase in the demand for rail access.

Industrial Acres

North Pickering should have approximately 2,000 industrial acres. (NO AIRPORT SCENARIO).

Industrial Park

Industry should be located in two or three industrial parks in North Pickering. No industrial park should be larger than 1100 acres.

DETAILED RESPONSE

Question 1

This question required a rating of location factors as "essential", "competitive edge" or "not relevant". In the "idealized" completed questionnaire which forms the appendix, each location factor is placed in the column as indicated by the majority of respondents. An asterisk indicates plurality support for a factor as classified. The plurality results are restated below.

Essential:

- Ready access to customers
- Ready access to labour
- Ready access to municipal services
- Ready access to suppliers
- Ready access to highway transportation
- Room for expansion

Competitive Edge:

- Environmental standards enforced in the local area
- Prestige location
- Proximity to industries engaged in similar production activities
- Ready access to air transportation
- Ready access to rail transportation

Not Relevant:

- National economic conditions
- Personal preferences of entrepreneur

As the "competitive edge" factors were listed in order of priority, it was possible to rank them in order of importance. However, not every one rated the same factors as "competitive

edge"; so that, although a majority rated cost of business accommodation as "essential", it also became the most important "competitive edge" factor because those who categorized it as "competitive edge" nearly always listed it first. Consequently, the group of "competitive edge" factors which received plurality support is not the same as the group rated most important.

Most important competitve edge factors:

Cost of business accommodation

Cost of services

Local tax level

Prestige location

Question 2

The consensus result from this question is that no change in "essential" or "competitve edge" factors is expected over the next twenty-five years.

Question 3 and 4

The problem with questions 3 and 4 has been discussed in the General Comments section of this report. Very few answers were given and for these answers the variation was so great that no useful results were obtained.

Question 5

There was good response to question 5 which asked for unusual requirements for specific industries. Recurring unusual requirements were outside storage, environmental problems and heavy users of water. (See appendix for a compete listing of responses.)

Question 6 - 9

Questions 6 - 9 were concerned with rail. The responses indicated that there has been some increase in demand for rail access by industry over the past year. This increase in demand is for immediate use and not as a hedge against problems in other sectors of the goods movement industry. Most respondents indicated that they expected the demand for rail access to increase in the future.

Question 6 asked what percentage of sites in an industrial area should have planned rail access. A more useful question would have been what percentage of the industrial area should be serviceable by rail. Given that the question was asked in terms of percentage of sites the most common answer was 20% and the average answer was 30%.

Question 10

The answers as to the desirable amount of industrial land in North Pickering were interesting. The range of figures was quite broad. One of the answers was ruled out due to the fact that it was larger than the total acreage in North Pickering. Several respondents indicated that with or without an airport the industrial acreage should remain the same, however the majority of respondents indicated that North Pickering would require more industrial land if the airport were built.

Question 11 - 15

Responses to these questions indicated that industrial development should be concentrated in a few industrial parks, that these parks should contain convenience services for the employees in the parks, that there is a growing trend to

include office buildings in industrial parks and that this trend was advantageous to secondary industry.

The range of answers for the minimum and maximum size for an industrial parks was broad. The most common answer for minimum acres was 50 while the average answer was 450 acres. The most common answer for maximum acres was 500 while the average answer was 1100 acres.

Question 16

The most common answer and the average answer for the percentage of industrial land to be treated as room for expansion by individual firms was 50%.

Questions 17-18

This proved to be a difficult question. 40% of the respondents gave no answer to these two questions. The remaining respondents indicated, on average, that 25 workers per acre when fully utilized and 15 workers per acre when initially occupied could be expected in an industrial area.

Questions 19 - 21

In terms of disposal of land and buildings, there was an overwhelming preference for flexibility.

Question 22

In terms of travel time, the respondents indicated that 10-15 minutes would be an appropriate separation time between the airport and a town centre.

Question 23

All answers to this question are listed in point form in the appendix.

APPENDIX TO PART I

An "idealized" completed questionnaire is presented in this section. The answers represent majority positions. The quantified answers are described in terms of the most common answer, the average answer and the range of answers. Where necessary, comments and explanations are provided.

COMPLETED "IDEALIZED" QUESTIONNAIRE CONCERNING

LOCATION AND SITE REQUIREMENTS OF SECONDARY INDUSTRY

(MANUFACTURING, WHOLESALE, CONSTRUCTION)

QUESTION 1

(The intent of this question is to establish:

A) Which location factors are essential to attract secondary industry

B) Which other factors would give a 'competitive edge' tc some particular location

C) Whether there is an order of priority among factors under (B)

D) Which factors, if any, have no relevance to attracting secondary industry.)

The attached list (see last page) of location factors is arranged in alphabetical order. For convenience only, in answering the questions, the location factors are also numbered.

Using the numbers, please place the factors in the three boxes provided below, which are labelled, Essential, Competitive Edge, Not Relevant.

In the case of the box labelled Competitive Edge, only, please list the factors in order of priority, i.e., the first number entered in this box indicates top priority for this category, and so on.

ESSENTIAL	COMPETITIVE EDGE	NOT RELEVANT
1	6*	4
2	8	9*
13	11*	10*
15*	12*	
16*	14	
17*	19*	
18*	22*	
21	24	
23*		

CATEGORIZED BY MAJORITY RESPONSE

* INDICATES PLURALITY

#3 and 7 TIED BETWEEN ESSENTIAL & COMPETITIVE EDGE

#5 TIED BETWEEN COMPETITIVE EDGE AND NOT RELEVANT.

Comments on Responses to Question 1

Of those factors labelled "competitive edge" the following were the most important:

Cost of business accommodation

Cost of services

Local tax level

Prestige location

It should be noted that Cost of business accommodation was considered "essential" by the majority but was ranked highest by those who considered it a "competitive edge". Cost of services was considered "essential" and as a "competitive edge" by an equal number of respondents.

QUESTION 2

(The intent of this question is to solicit opinions as to whether in the future, say 1985-2000, the location requirements of secondary industry are likely to change markedly and could be planned for.)

Please refer to your answers to Question 1.

Based on your knowledge and experience and your working contacts with industry, do you think the location requirements of secondary industry are likely to change markedly in the future?

If in your opinion, the same allocation of factors to Essential and Competitive Edge as you made in answering Question 1, is likely to apply in the future, please write "no change" under each of the headings provdied below.

If, in your opinion, a different allocation is likely to apply in the future, then, using the numbers provided on the attached list of location factors, and including the numbers of any additional factors you may have added to this list, please allocate the appropriate factors to the boxes provided below. Please disregard any factors you think will not be relevant in the future.

In the case of factors allocated to the box labelled Competitive Edge only, please circle the three factors you think will be most important. (No other ranking or priority in your answer will be assumed.)

If, in your opinion, some new location factors, not included in your answer to Question 1, will become relevant in the future, please list these factors in the appropriate box below, i.e. Essential or Competitive Edge.

If applicable, please include these new factors among the three to be circled as "most important" in the box labelled Competitive Edge.

ESSENTIAL	COMPETITIVE EDGE
90% responded "no change"	Approximately 70% responded "no change"

QUESTIONS 3, 4 and 5

(The intent of these questions is to establish:

A) If some types of industry have different or additional essential location requirements from those which apply to secondary industry as a whole

B) If different types of industry would place a different order of priority on factors which might give a competitive edge to some particular location

C) If some types of industry have location requirements which are unique or unusual.

Provision to answer Question 3, 4 and 5 as they relate to various "industry types" is made jointly in the following pages 5, 6, 7 and 8.) For illustrative purposes only, "dummy" answers to these questions are provided on the following page.

The North Pickering Project has undertaken studies to determine which types of industries market forces might tend to induce in North Pickering. In each of the boxes below, the title in capital letters indicates a broad industry grouping, and the titles in upper and lower case are examples of types of industries included in this broad grouping, e.g. FOOD AND BEVERAGE is a broad industry group and Dairy Products Industries, and Bakery Products Industries are types of industries within this group.

Please refer to your answers to Question 1.

QUESTION 3

In the case of each "industry type", if this industry has precisely the same essential location requirements as those which apply to secondary industry in general, please place a tick (✓) in the appropriate box.

If any "industry type" has essential location requirements, which are different from the general, please list them. If any of these factors is not included on the attached list, please circle them.

QUESTION 4

In the case of each "industry type" if, in your opinion, this industry is likely to place the same order of priority on factors giving a competitive edge, as in the general case, please place a tick (✓) in the appropriate box.

If not, please provide the order of priority appropriate to this industry.

QUESTION 5

If, to your knowledge, any "industry type" has unique or unusual location requirements, please list these in the box provided. PLEASE NOTE that any such unique or unusual requirements should also appear either among the industry's essential requirements or in its priority ranking for factors giving a competitive edge.

"DUMMY" ANSWERS ONLY TO QUESTIONS 3, 4 and 5

Dummy Illustration I - Assuming

- in answer to Question 3 that an industry has different essential requirements from secondary industry in general
- in answer to Question 4 that an industry is likely to place the same order of priority on factors giving a competitive edge as in the general case, and
- in answer to Question 5 that it has one unique requirement which is essential and not included in the attached list of location factors.

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
WIDGET MAKERS			
Small blue widgets	24, 23, 7, 10, 9, 15 Blue Water	✓	Heavy Users of Blue Water

Dummy Illustration II - Assuming

- in answer to Question 3 that an industry has the same essential requirements as secondary industry in general
- in answer to Question 4 that an industry is likely to place a different order of priority on factors giving a competitive edge, and
- in answer to Question 5 that it has no unique or unusual requirements

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
WIDGET MAKERS			
Green square widgets	✓	3, 1, 4, 8, 11	✓

Comments on Responses to Questions 3, 4 and 5

#3 50% of responses indicated no change or were blank.

#4 50% of responses indicated no change or were were blank.

#5 Approximately 65% of respondents gave at least partial answers to question #5. Answers to #5 are listed on the questionnaire.

PROVISION FOR ANSWERING QUESTIONS 3, 4 and 5

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
FOOD AND BEVERAGE	(THE FOLLOWING IS A LIST OF RESPONSES TO #5 ONLY).		
Dairy Products Industries	- Nearby farms - Heavy users of water - Expansion capability - Refrigerator areas		
Bakery Products Industries	- Cooking fuel (gas, hydro) - Expansion capability		
RUBBER & PLASTICS			
Plastic Fabricating	- Proximity to support industries - Heavy users of water - High fire risk, sprinklers etc. - Flame free heat - Outside storage		
TEXTILE			
Man Made Fibre, Yarn and Cloth Mills	- Large labour requirements - Good economic conditions in local area - Proximity to support industries - Low cost land and building - Capital intensive - Heavy users of water		
WOOD INDUSTRIES			
Sash Door & Other Millwork Plants	- Reliance on imported lumber - Rail sidings - Tend to locate near raw materials - Environmental problems - noise etc. - Outside storage - Fire protection		
FURNITURE & FIXTURES			
Household Furniture Manufacturers	- Locate in an area with tradition for required skills - Proximity to support industries - Sound and environmental problems - Cheap labour - Close to market - Outside storage		

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
PAPER & ALLIED			
Asphalt Roofing	- Environmental problems - Close to raw material - Outside storage		
Paper Box and Bag Manufacturers	- Close to labour - Very low cost labour - Environmental problems - Outside storage		
PRINTING, PUBLISHING			
Commercial Printing	- Access to customers - Environmental problems - Low cost land and buildings		
Publishing Only	- High volume of customers - Government subsidies		
Printing & Publishing	- Environmental problems - Government spending on education		
PRIMARY METAL			
Iron Foundries	- Environmental problems - Outside storage		- dust - noise - vibrations
METAL FABRICATING			
Ornamental & Architectural Metal Industries	- Environmental problems - Proximity to market - Outside storage		
Metal Stamping Pressing & Coating	- Environmental problems - Outside storage		- noise

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
METAL FABRICATING Cont'd			
Wire & Wire Products	- Environmental problems - Rail - Outside storage		
Hardware Tool & Cutlery	- Environmental problems		
Heating Equipment Manufacturers	- Proximity to support industries - Environmental problems		
Machine Shops	- Environmental problems - Heavy duty electric power		
MACHINERY INDUSTRIES			
Agricultural Implement Industries	- Good national economic conditions - Rail facilities - Outside storage		
TRANSPORTATION EQUIPMENT INDUSTRIES			
Motor Vehicle Parts & Accessories Manuf.	- Rail - Outside storage		
ELECTRICAL PRODUCTS			
Manu. of Major Appliances	- Telephone lines for data transmission - Rail - Outside storage		

	Essential Location Requirements	Priority Ranking of Competitive Edge Factors	Unique or Unusual Requirements
NON METALLIC MINERAL PRODUCTS			
Concrete Products	- Large acreage - Low cost land - Environmental problems - Heavy users of water - Rail - Outside storage		
Ready Mix Concrete Manu.	- Large acreage - Low cost land - Environmental problems - Heavy users of water - Good access to raw materials - Outside storage		
CHEMICALS			
Manu. of Soap and Cleaning Compounts	- Large volume of effluent - Unpleasant odours (environmental problem) - Rail - Heavy users of water - Outside storage		
Manu. of Industrial Chemicals	- Large volume of effluent - Unpleasant odours (environmental problem) - Rail - Heavy users of water - Good access to raw materials - Outside storage		
MISC. MANU. IND.			
Scientific & Professional Equipment	- Prestige location - Access to air transportation - Technical labour		

Note: A check is being made to determine whether, due to unusual servicing requirements, environmental constraints or for any other reason, some industries initially identified as probable, would not be suitable for the North Pickering site.

QUESTION 6

Under present conditions and bearing in mind the cost of the service, what percentage of sites in an industrial area should, in your opinion, have planned rail access?

Most common	20%
Average	30%
Range	3-60%

QUESTIONS 7, 8 and 9

(The intent of these questions is to solicit opinions as to whether there is likely to be a significant increase in the demand for rail facilities, due to the increasing cost of gasoline products. The point is of some importance in planning a new town.)

QUESTION 7

In the last, say 12 to 18 months, have you noticed an increase in the number of firms including rail access among their location requirements?

Yes ✓ By 1.6 to 1 margin

No 0

(Please tick one)

QUESTION 8

If your answer to Question 7 was "yes", were the majority of these increased enquiries from firms which intended to make immediate use of rail facilities, or were they required as "back-up" facilities?

Immediate use ✓ By a 1.8 to 1 margin

Back-up 0

(Please tick one)

QUESTION 9

Based on your experience and your working contacts with industry, do you think there is likely to be a significant increase in the demand for rail access within, say 10 years?

Yes ✓ By a 6 to 1 margin

No 0

(Please tick one)

Please add comments if you wish.

QUESTION 10

Given a population of 70,000 to 90,000 for a new town approximately 20 miles from downtown Toronto, how many acres would it be desirable to allocate to industrial use:

- assuming the proposed new airport is built _____ acres

Please give reasons if possible.

Most common	1,000
Average approximately	3,500
Range	500-20,000

- assuming the proposed new airport is not built _____ acres

Please give reasons if possible.

Most common	1,000
Average approximately	2,000
Range	250-10,000

QUESTION 11

Is it preferable:

✓ to locate industry in two or three fairly large groupings or industrial parks,

O to scatter industry throughout the town site, or

O to have some industrial parks and some scattered locations

(Please tick one)

Please give reasons if possible.

By a 2 to 1 margin over the remaining answers combined.

QUESTION 12

If, in your opinion, parks are desirable, approximately how many acres should an industrial park comprise?

Minimum _____ acres

Most common	50
Average approximately	450
Range	20-2,500

Maximum _____ acres

Most common	500
Average approximately	1,100
Range	100-8,000

QUESTION 13

Assuming the existence of fair-sized industrial park(s), is it worthwhile to attract to them such convenience services as branch bank, dry cleaning, restaurants?

Yes ✓ By an overwhelming majority.

No O

(Please tick one)

QUESTION 14

In your opinion, is there a growing trend to locate some office buildings in industrial areas?

Yes ✓ By an overwhelming majority

No 0

(Please tick one)

QUESTION 15

In your opinion, does the location of some office buildings in industrial areas offer any advantages to secondary industry?

Yes ✓ By an overwhelming majority

No 0

(Please tick one)

QUESTION 16

Approximately what percentage of industrial land should be treated as room for expansion by individual firms?

Most common 50
Average approx. 50
Range 20-100

QUESTION 17

Approximately how many industrial workers per acre can be expected when industrial areas are fully utilized?

_____ workers per acre.

Most common 25
Average approx. 25
Range 10- 50

QUESTION 18

Approximately how many industrial workers per acre can be expected when sites are initially occupied?

Most common 15

_____ workers per acre.

Average approx. 15
Range 3-20

QUESTION 19

Is it useful for the industrial developer to construct some industrial buildings "on spec."?

Yes ✓ By an overwhelming majority

No 0

(Please tick one)

QUESTION 20

If your answer to Question 19 is "yes", approximately what percentage of the industrial land should be devoted to this purpose?

Most common 10
Average 25
Range 2-100

QUESTION 21

Is it useful for the industrial developer to have a "package" of disposal instruments, e.g.

- sell/lease land
- lessee of land constructs and owns buildings
- lease land and building

✓ Yes — By an overwhelming majority

0 No

(Please tick one)

If appropriate, please provide other disposal options:

QUESTION 22

Assuming the proposed new airport is built, by approximately what travelling time, by car or public transit, should the town centre be separated from the terminal, if hotels in the town centre are to be attractive to air travellers?

Less than 5 mins.	0	
5 - 10 mins.	0	
10 - 15 mins.	✓	By a 2.3 to 1 margin over 5-10 min. No responses were received indicating less than 5 min.
other, please specify.		

Please add comments, if appropriate.

QUESTION 23

If you were the person responsible for planning the industrial development of a new town, population 70,000 - 90,000 and were required to:

a) best accommodate likely industrial residents, and

b) attract specifically desirable enterprises, given the factors already covered in this questionnaire, what other factors in the industrialist's location decision-making problem, would you address?

FOR LIST OF RESPONSES SEE NEXT PAGE.

#23 - Each of the suggestions re #23 are listed below:

- One company may wish its own industrial park
- Communications facilities
- Reliability of services especially electric
- Attractive industrial park
- Sales promotion for industrial park
- Roads 6 lanes C/W speed control safety medium
- Adequate street lighting
- Minimum front yard set-back of 50 ft. (of green area) plus parking depth
- Services such as hydro, telephone, gas mains etc. - to be at rear of property on a municipal easement
- Maximum land coverage - 65%
- Hidden outside storage
- No concrete block permitted on front of buildings or at sides for a depth of 50 ft.
- Planned recreational facilities, e.g.,golf course, bowling lanes, swimming pool etc.
- Planned car service centres should be included in zoning
- Industrial and commercial promotional department reports made only to Council through an industrial committee
- Schools all grades to university level
- Recreation facility for all seasons, entertainment facilities and opportunity
- Environmental conditions - parks, lakes (artificial) flora etc.
- Low cost of land
- Availability of mass, rapid, public transportation
- Tax benefits (if any) e.g. grants, low cost loans

- Encourage financial institutions to provide adequate mortgage and credit facilities for a new town venture.
- Commuter train
- Red tape elimination for the developer/industrialist by all levels of government
- Reasonable initial purchase down payments
- Provide flexible decision-making structure
- Set up a guaranteed real estate commission for brokers
- Set up a form of prospect registration for the brokers' protection
- Facilitate rapid handling of building permits
- Price of serviced industrial land to be attractive enough to interest large industry - small will follow
- Include low cost, public, rapid transit facilities in planning layout to serve not only the residential community but industrial areas and seriously consider how rapid transit could be tied in to an extension with Metro Toronto's system, and to direct connections with the airport.

LIST OF LOCATION FACTORS

1. Availability of suitable housing for employees.
2. Cost of business accommodation (land and buildings).
3. Cost of services (e.g. water, sewage, hydro)
4. Cultural, recreational and social opportunities of the local area
5. Economic conditions of the local area
6. Environmental standards enforced in the local area
7. Local development policy
8. Local tax level
9. National economic conditions
10. Personal preference of entrepreneur (e.g. close to his home, country club)
11. Prestige location
12. Proximity to industries engaged in similar production activities
13. Proximity to support industries (e.g. repair & maintenance, trucking, warehousing)
14. Proximity to support services (e.g. bank, insurance, real estate, restaurant)
15. Ready access to customers
16. Ready access to labour
17. Ready access to municipal services (e.g. fire, garbage, police)
18. Ready access to suppliers
19. Ready access to transportation - air
20. Ready access to " - highway
21. Ready access to " - public transit
22. Ready access to " - rail
23. Room for expansion
24. Vocational and/or job training, extension program opportunities of the local area.

IN THE SPACE ABOVE, PLEASE ADD TO THIS LIST IF APPROPRIATE. GIVE EACH ADDITIONAL FACTOR A NUMBER AND ALLOCATE IT TO A BOX PROVIDED FOR THE ANSWERING OF QUESTIONS 1, 2, 3, 4 and 5.

PART II

THE NEW MANUFACTURING ESTABLISHMENTS SURVEY RESPONSE ANALYSIS

PART II

THE NEW MANUFACTURING ESTABLISHMENTS SURVEY

RESPONSE ANALYSIS

In November 1974, the North Pickering Project mailed an unsolicited questionnaire to selected new manufacturing establishments in the Toronto area. The purpose of this survey was to establish from direct contact with the managers of new manufacturing establishments why they located where they did.

A total of 49 questionnaires (see attached sample) were sent out and 18 were returned, giving a 36% response to the survey. The firms contacted were selected from "New Manufacturing Establishments in Canada", Statistics Canada, 1973. They represented a variety of activities across the broad spectrum of the manufacturing sector of Ontario.

A telephone follow-up was also employed, but did not elicit any additional responses. It did establish, however, that at least 8 companies went out of business in the intervening time, and that one had moved to Georgetown, outside the study area.*

PROFILE OF A NEW FIRM:

From the tabulated responses, the following picture emerged: A brand new manufacturing enterprise, locating in the suburbs of Toronto* requires:

a) an average of 8,300 square feet of floor space, (range 3,000 to 15,000)

b) in a leased building

c) on leased land

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* The study area comprised: Mississauga, Etobicoke, Weston, Thornhill, Richmond Hill, Downsview, Don Mills and Scarborough.

THE DETAILED RESPONSE:

The following is a detailed response to the questionnaire:

		Frequency of Response	% of Total Respondents
Brand new enterprise		15	84
and/or branch		2	11
Relocated since establishment:	yes	7	39
	no	11	61
Number of employees when started:	1-4	12	66
	5-15	5	28
	16-49	1	6
Number of employees now:	1-4	1	6
	5-15	12	66
	16-49	4	22
	50-100	1	6
Land site -	leased	13	72
	owned	5	28
Buildings -	leased	13	72
	owned	5	20
Buildings were -	in existence	13	72
	built to specification	5	28

Deciding Socio-economic Factors:

Suggested by the questionnaire:	- personal preference	12	67
	- availability of labour	7	39
	- proximity of public transit	5	28
	- prevailing wages	1	6
Added by the respondents:	- close to residence of principals	6	33
	- stable labour force with pride in workmanship	1	6
	- prestige building	1	6
	- good resale value in case of failure	1	6

Deciding Commercial Factors:		Frequency of Response	% of Total Respondents
Suggested by the questionnaire:	- local taxes	6	33
	- ready access to customers	5	28
	- proximity to supplies	4	22
	- availability of support services	4	22
	- transportation costs	3	17
	- transportation facilities	3	17
	- proximity to warehousing facilities	1	6
Added by respondents:	- proximity to highway 401	2	11
Deciding Factors for Choosing the Site:			
	- price of land	7	39
	- room for expansion	6	33
	- zoning regulations	6	33
Added by respondents:	- truck level loading	1	6
Proximity to an airport:			
	doesn't matter	13	72
	useful	4	22
	very important	1	6
Considering relocation in 5 years:			
	yes	9	50
	don't know	6	33
	no	3	17
Among reasons given for considering relocation:			
	expansion	5	28
	to build own premises	2	11

and: high taxes, high hydro rates, excessive land prices in North York, labour pool dried up, local services non-existent

	Frequency of Response	% of Total Respondents
Companies planning on moving indicated their preference for:		
- west of Metro	8	44
- east of Metro	4	22
- north of Metro	8	44
- Metro Toronto	2	11
Type of Site Preferred:		
- large industrial area	6	33
- no preference	6	33
- industrial park	5	28
- mixed zoning	2	11

Land Requirements:

Only 8 (44%) companies indicated the size of their land. It varied from low 1/4 acre to high of 7 1/2 acres.

Building (floor space) Requirements:

All companies indicated the square footage of their manufacturing establishments. It varied from low 3,000 square feet to high of 15,000 with average (arithmetic mean) of 8,300 square feet.

SUMMARY OF RESULTS

Initial Space Requirements:

A small manufacturing firm with 1-49 employees, regardless of the type of its product, typically needs 3,000 to 15,000 square feet of leased floor space and very little, if any land during the initial 1-2 year period.

This configuration indicated that the following initial location factors must be met:

- existence of suitable buildings with 3,000 to 15,000 square feet units of floor space for 1-3 year lease;
- some room available for immediate expansion on existing site

- adequate power and water supply

After the initial period, the firm is likely (3:1) to move to a new, more spacious location, mostly but not always, in the same general area.

Initial Service Requirements:

There seems to be only slight indication that any services other than sewage, garbage and basic power and water supply are needed in the initial period.

One might suspect that as a firm grows, more services are required in proportion to the size of the business; but generally, the presence or absence of services was mentioned in only a few replies. Presumably, therefore, they are of secondary importance to a new firm choosing its initial location.

Initial Transportation and Warehousing Requirements:

Proximity to highway and other transportation facilities and transportation costs were hardly mentioned. Again, one might suspect that at the initial stage, when volumes of business are rather small, transportation is not a crucial factor.

LIST OF LOCATION FACTORS SUGGESTED BY THE QUESTIONNAIRE

Factors mentioned most frequently:	Frequency of Response	% of Total Respondents
Personal preference	12	66
Availability of labour	7	39
Price of land	7	39
Local taxes	7	39
Proximity to the residence of principals	6	33
Room for expansion	6	33
Zoning regulations	6	33
Proximity of public transportation	5	28
Ready access to customers	5	28
Factors mentioned least frequently:		
Proximity to suppliers	4	22
Availability of support services	4	22
Transportation costs	3	17
Transportation facilities	3	17
Proximity to highway 401	2	11
Proximity to warehousing	1	6
Prevailing wages	1	6
Proximity of social, cultural etc. facilities	0	0

IMPLICATIONS FOR NORTH PICKERING

Based on the results of this survey, it would appear to be advantageous for North Pickering, as a new town, to seek to attract new manufacturing establishments in the initial stages of its development, principally because their servicing and transportation requirements are minimal.

If North Pickering is to attract new manufacturing establishments, then it will be necessary to:

- provide relatively small leased floor space on leased land
- maintain attractively low rental costs
- acquaint entrepreneurs with the potential advantages of locating in a prestigeously planned new town
- have the capacity to offer a suitable residence for the entrepreneur
- acquaint entrepreneurs with the fact that North Pickering will have adequate room for expansion

NEW ESTABLISHMENTS QUESTIONNAIRE

Instructions: *Please check the answer(s) applicable in each question, or provide other answers if appropriate.*

1 A: Your company is:
- 0 brand new enterprise
- 0 branch
- 0 other (please specify)

1 B: Your company started (month, year):

1 C: Have you relocated since your establishment?

- 0 yes
- 0 no (please give reason(s))

1 D: Number of employees:

	When started	now
1 - 4	0	0
5 - 15	0	0
16 - 49	0	0
50 - 100	0	0
Over 100	0	0

2 A: Land (site) is:
- 0 leased
- 0 owned
- 0 other (please specify)

2 B: Approximate size of land:

_____ square feet

OR _____ acres

Approximate floor space of buildings:

_____ square feet

2 C: Buildings are:
- 0 leased
- 0 owned
- 0 other (please specify)

2 D: Buildings were:
- 0 in existence
- 0 built to your order

3 : Among the deciding factors for choosing the location were socio-economic factors:

- 0 availability of labour
- 0 personal preference
- 0 prevailing wages in the area
- 0 proximity of public transportation
- 0 proximity of social, cultural, recreational or educations facilities
- 0 other (please specify)

4 : Among the deciding factors for choosing the location were commercial factors:

- 0 availability of support services (e.g. banking, copying-duplicating, restaurants, etc.)
- 0 local taxes
- 0 proximity of warehousing facilities
- 0 proximity to suppliers
- 0 ready access to customers
- 0 transportation costs
- 0 transporation facilities
- 0 other (please specify)

5 : Among the deciding factors for choosing the site were:

- 0 price of land
- 0 room for expansion
- 0 zoning regulations
- 0 other (please specify)

6 : How do you rate proximity to an airport:

- 0 very important
- 0 useful
- 0 doesn't matter

7 : Are you considering relocation in, say, the next 5 years?

- 0 don't know
- 0 no
- 0 yes

If answer is "yes" or "no", please give reason(s).

8 : If yes, where would you like to be?

- 0 Metro Toronto
- 0 East of Metro
- 0 North of Metro
- 0 West of Metro

(Please give reson(s) for your answer.)

9 : Preferred site:

- 0 industrial park
- 0 large industrial area
- 0 mixed zoning
- 0 doesn't matter
- 0 other (please specify)

PART III

LOCATION FACTORS - LITERATURE REVIEW

PART III

LOCATION FACTORS - LITERATURE REVIEW

The results of several industrial surveys, and numerous books* were examined to provide a review of factors influencing the location of manufacturing industries. This paper summarizes the ideas contained therein.

Location factors are those external and internal forces which induce a particular industry to choose a particular location. A sustained effort is being made by economists around the world to identify these forces, so that new industries and new establishments can benefit from the presence or absence of other specific industries, topographic features or economic conditions.

The most exhaustive study examined was carried out by the American Trucking Association (ATA 63). The study covered over 1,300 firms in the continental U.S.A. The firms surveyed represented all branches of manufacturing. This paricular survey seemed so valuable that its entire Appendix A is attached to this paper. Other surveys examined used much smaller samples, usually less than 100 firms (Britton 67, Blackbourn 68, ECBC 69).

The results and conclusions from all surveys were quite similar, as can be seen from tables 1, 2, 3.

The top-scoring four factors, namely labour, land-site, raw materials, and market are also the essential factors of production. The absence of any of these factors will render production impossible. Their relative ranking is therefore unimportant.

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* See bibliography.

TABLE 1

THE TOP SIX FACTORS
AFFECTING THE DECISION OF COMPANIES
TO ESTABLISH SECONDARY MANUFACTURING PLANTS IN BRITISH COLUMBIA

Top 6 Factors Ranked by Agencies			Top 6 Factors Ranked by New Cos.			Top 6 Factors Ranked by Prospect Cos.		
	Factor	Points		Factor	Points		Factor	Points
1.	Markets	112	1.	Markets	118	1.	Markets	127
2.	Availability and cost of plant sites	46	2.	Raw materials	48	2.	Raw materials	67
3.	Wage levels	38	3.	Labour supply	35	3.	Wage levels	46
4.	Transportation facilities	37	4.	Presence of existing industries	34	4.	Labour-mgt. climate	41
5.	Labour supply	35	5.	Transportation facilities	33	5.	Labour supply	40
6.	Govt. policy and tax structure	33	6.	Govt. policy and tax structure	31	6.	Transportation facilities	35
No. of agencies replying =		21	No. of new cos. replying =		22	No. of prospect cos. replying =		24

Source: "Limitiations and Attractions of British Columbia for Industry", Employer's Council of British Columbia, 1969.

RANKING OF PLANT LOCATION FACTORS

TABLE 2

RANKING OF PLANT LOCATION FACTORS FROM FIRST THROUGH 13TH FOR ALL RESPONDENTS, FOR 22 MAJOR SIC GROUPS, AND FOR A MISCELLANEOUS CATEGORY

Factor	All	Major SIC groups. 20	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	42	50	73	Misc.
Proximity to good highways	1	2	2	2	6	1	5	1	1	1	1*	2	2	3*	1	1	2	1*	4	1	2	1	1*	2
Abundant labor supply	2	5	1	1	3	2	1	3	5	7	1*	1	5	2	2	2*	1	1*	1*	2	6	5	3	6*
Availability of suitable land	3	3	3	5	4*	3*	2	2	2	2	4	5	6	1	4	2*	3	4	1*	5	1	3	1*	1
Proximity to markets	4	1	5*	7	4*	3*	3*	4	3	3	3	6	1	3*	3	4	4	3	3	3	3	2	7*	3
Availability of rail service	5	6	11	11	1*	5	3*	5	4	5	9	8*	4	5	5	7*	11	6*	7*	6	4	4	7*	4
Availability of raw materials	6	4	5*	9	1*	6	6	11*	7	4	12*	10	3	7	9	6	8	11	10	9*	9	9	13	8
Favorable tax structure (state or local)	7	9*	9	6	7	8	8*	6*	8	10*	7*	4	8	6	6	5	5	5	7*	7*	8	8	5*	9
Favorable leasing or financing	8	8	4	3	11	7	7	8	11	10*	5*	3	9	10	7	7*	6	6*	5	4	7	7	4	10
Abundant water supply	9	7	10	12	8	10	8*	13	6	6	5*	8*	7	8	10	12	12	12*	11*	13	10	11	12	6
Proximity of related industry	10	11	8	8	9*	11	10	9	9	8	10	11*	10	9	11	9	7	9	7*	9*	5	6	5*	5
Existence of building at site	11	9*	5*	4	9*	9	11	10	10	9	7*	7	11	11	8	10	9*	8	13	9*	11*	10	7*	11*
Community's cultural-recreational assets	12	12	12	13	12	12	12	6*	12	10*	11	11*	12	12	12	11	9*	10	6	7*	11*	12	7*	11*
Nearby vocational training facilities	13	13	13	10	13	13	13	11*	13	10*	12*	13	13	13	13	13	13	12*	11*	12	13	13	7*	10

* Tied

TABLE 3

RANKED LOCATION FACTORS: INDUSTRIAL SURVEY

Frequency Response for NEW Factories

Location Factor	*Frequency*
Availability of labour in the area	22
Scope for expansion on site	14
Attractive price of land or building	13
Presence of suitable building	11
Adequate supply and satisfactory type of water	6
Access to markets	5
Regional location of firm's headquarters	5
Good labour relations in the area	4
Availability of raw materials and components	4
Personal—with economic advantages	3
Anticipation of market growth	3
Low freight cost on raw materials and components	2
Flat land	2
Personal—without economic advantages	2
Low freight cost to markets	1
Low cost of fuel and power	1
Availability of local capital	1
War dispersal	1
Low purchase price of raw materials and components	0
ALL FACTORS	100

Source: Table 2 - "Highways, Trucks and New Industry", American Trucking Association, Washington, D.C., 1963.

Table 3 - Britton, J., "Regional Analysis and Economic Geography", Bell & Sons Ltd., London (England), 1967.

The requirements for intermediate factors, such as water, power and transportation, vary from industry to industry. (See Appendix A, and table 5.) The remaining factors are not essential for the location of industry, but are instrumental in producing a competitive environment. These include the local tax structure, proximity of related industry, vocational training facilities, etc.

The basic set of location factors emerged as follows:

1) market
2) abundance of labour
3) transportation infrastructure
4) availability of water and power

Existence of a market is the most essential factor for any economic activity. In this paper, the market size, present or potential, has been deliberately omitted from the list of necessary location requirements. Existence of a market is assumed to be given exogeneously. Metro Toronto, and the remainder of Central Southern Ontario represents a sizeable portion of the total Canadian market for both producer and consumer goods. Market, however, plays two other roles: as a cost determining factor in transportation, and as a force facilitating easy exchange and dissemination of technological, economic and other thought. Market in these two roles is the market mentioned throughout this paper.

LAND AND BUILDING REQUIREMENTS

There is an almost infinite number of possible locations for a manufacturing establishment, providing that the following crieria are met:

a) The land must be flat or gently rolling with slopes of 10% or less.

b) The soil must have sufficient bearing capacity and a suitable water table level (UN 62, Bredo 60, Harkt 56).

Industry has been known to locate in much more adverse conditions; the expenditure on land improvement, however, rises with the degree of deviation from the set of ideal conditions as put forth above. At present, the favoured approach to land use for industry is by means of planned industrial areas, called variously parks, districts or estates. In this review, the term "park" has been chosen as best expressing the trend toward developing park-like and aesthetically pleasing industrial sites (Bredo 1960). There is no optimum size of a park. Maximum and minimum must be interpreted within a given set of circumstances. Industrial parks are known to range from 50 acres to several thousand acres (UN 1962), although parks larger than 3,000 acres might create severe traffic problems (Harkt 1956).

There is considerable room for manoeuvre in the area of land improvement. The developer can sell or lease the sites fully improved or improved to various degrees. One source (Harkt 1956) gives the ratio of money invested in land to money spent on improvement as ranging from 1 to 7. This, however, has to be interpreted for each individual park, if not each individual site. It is immediately evident, for example,

that inexpensive bog land will require the expenditure of large sums of money to make it suitable for industry, while very expensive land taken from active agriculture will only require minimal additional spending on improvement. To estimate the approximate cost of development, it is best to look into comparable developments elsewhere. (Harkt 1956)

Neither can an optimum size of lot be established. It varies with a particular firm's requirements for building space, outdoor manufacture, outdoor storage, loading and unloading, and parking. There is a concensus, however, that lots should be offered in sizes ranging from 1/2 to 5 acres, and larger if necessary. (Harkt 56, UN 62, NPP 74)

The preferred shape of lot is rectangular with sides raio of 2:1. (Harkt 56) The lot frontage of 120 feet with depth of 200-500 feet is most frequently mentioned. (Harkt 56, Bredo 60, UN 62). The sites should be serviced by road, power, water and sewer, especially for smaller firms, as the ability of firms to pay for capital works is directly associated with the size of the firm. On the other hand, larger corporations prefer to have the roads, water and power lines built to specifications. (Harkt 56).

An identical situation exists in the area of buildings. Small business prefers to find a building on site, while large establishments frequently build their own. The size of building varies considerably. In particular, a distinction should be made between a brand new enterprise, and a branch plant of an established company. Both firms might wish to locate in the same area but their building requirements will be different. A brand new enterprise might want to move in

to an existing building with generous room for expansion, which can be leased in stages. A certain minimum space is a pre-requisite. This seems to be approximately 3,000 square feet, with multiples of this space being readily available. (Bredo 60, NPP 74).

ROOM FOR EXPANSION

Room for expansion is among the chief location factors. There is hardly a business which does not expect to increase production in future and therefore has subsequent expansion programmes in mind. In consequence, it is absolutely essential to provide additional land, in suitable configurations, adjacent to original sites. There is little agreement in the literature as to what percentage of land should be held by the developer for expansion purposes, as this depends on the type of industry, initial size of firm, general economic conditions, etc.

However, young and growing industries require special facilities to accommodate their growth. This can take the form of a larger building, typically a block of 6,000, 11,500 or 23,000 square feet, divisible by moving partitions into segments of 3,000 or 1,500 square feet for maximum flexibility, having truck-level loading facilities. Some should be on a rail siding. (Bredo 60, UN 62).

STAGING OF DEVELOPMENT

The staging of the development of an industrial park can have important location implications. To a great extent, the first installation tends to influence the subsequent development of the whole park regardless of layout or managerial planning. (Harkt 56).

In staging the proper development of the park, it should be noted that the lead time, or the time between the conception of a new plant, and its entry into production varies directly with the size of the plant rather than type of manufacture. The lead time seems to be less than 1 year for small plants (less than $1,000,000), 1 to 2 years for medium-sized plants, and up to 5 years for large complexes. (ECBC 69).

TRANSPORTATION

Transportation ranks consistently high on lists of location factors. This term includes two major areas: The general transportation infrastructure, i.e. access to highway and rail, as well as to air and water transportation, and transportation facilities and road layouts in the industrial park. The latter is simple to deal with. A well designed park will have sites served by roads, which will be minimal in length, while maximizing connection of sites with major arteries. The roads, especially the primary ones, will have a minimum number of intersections, especially with the other dominant mode - rail. The roads must be able to accommodate large trucks and heavily laden multi-axle tractor-trailers at reasonable speeds. Moreover, the park has to be designed in such a way that the

TABLE 4 PREFERENCE OF MAJOR INDUSTRY GROUPS FOR HIGHWAYS OR RAIL

EXTENT TO WHICH MAJOR SIC GROUPS MENTIONED THE HIGHWAY FACTOR

Activity	Rank	SIC group	Number responding	% Mentioning h'way factor
Printing, publishing, and allied industries	1	27	28	100.00
Wholesale trade (including distribution centers)	2	50	51	91.07
Petroleum refining and related industries	3	29	18	88.89
Leather and leather products	4	31	20	80.00
Fabricated metal products, except ordnance, machinery, & transp. equip.	5	34	128	79.69
Furniture and fixtures	6	25	42	76.19
Misc. manufacturing industries (incl. athletic equipment, jewelry, etc.)	7	39	21	76.19
Machinery, except electrical	8	35	116	75.86
Rubber and miscellaneous plastic products	9	30	33	75.76
Stone, clay, and glass products	10	32	74	75.67
Motor freight transp. & warehousing (included because of warehousing)	11	42	28	75.00
Food and kindred products	12	20	102	72.55
71.6% of all respondents mentioned highway factor				
Textile mill products	13	22	49	71.43
Apparel & other finished products made from fabrics & similar materials	14	23	65	70.77
Electrical machinery, equipment and supplies	15	36	93	67.74
Transportation equipment	16	37	65	67.69
Chemicals and allied products (including plastics and drugs)	17	28	160	65.62
Primary metals	18	33	47	61.70
Paper and allied products	19	26	57	61.40
Misc. business services (important in survey because of commercial R&D)	20	73	20	55.00
Lumber and wood products, except furniture	21	24	35	54.29
Professional, scientific, and controlling instruments	22	38	20	45.00

NOTE. Groups are ranked according to the percentage of respondents within each group mentioning the highway factor.

EXTENT TO WHICH MAJOR SIC GROUPS MENTIONED THE RAIL FACTOR

Activity	Rank	SIC group	Number responding	% Mentioning rail factor
Lumber and wood products, except furniture	1	24	35	74.29
Paper and allied products	2	26	57	66.67
Wholesale trade (including distribution centers)	3	50	51	64.71
Stone, clay, and glass products (concrete)	4	32	74	60.81
Chemicals and allied products (including plastics and drugs)	5	28	160	58.75
Motor freight transp. & warehousing (included because of warehousing)	6	42	28	50.00
Furniture and fixtures	7	25	42	47.62
Printing, publishing and allied products	8	27	26	46.15
Misc. business services (important in survey because of commercial R&D)	9	73	20	45.46
Fabricated metal products, except ordnance, machinery, & transp. equip.	10	34	128	42.19
Food and kindred products	11	20	102	42.16
Primary metals	12	33	47	40.43
40.2% of all respondents mentioned rail factor				
Transportation equipment	13	37	65	35.38
Misc. manufacturing industries (incl. athletic equipment, jewelry, etc.)	14	39	21	28.57
Machinery, except electrical	15	35	116	27.59
Rubber and miscellaneous plastics products	16	30	33	27.27
Professional, scientific, and controlling instruments	17	38	20	25.00
Petroleum refining and related industries	18	29	18	22.22
Leather and leather products	19	31	20	20.00
Electrical machinery, equipment and supplies	20	36	93	18.28
Textile mill products	21	22	49	12.24
Apparel & other finished products made from fabrics & similar materials	22	23	65	7.69

NOTE. Groups are ranked according to the percentage of respondents within each group mentioning the rail factor.

Source: "Highways, Trucks and New Industries", American Trucking Association, Washington, D.C. 1963.

long frontages of buildings will not reflect large amounts of sunshine. (Bredo 60, UN 62).

There is no firm rule for determining the number of sites to be served by rail. This will largely depend on the type and size of establishments locating in the park. Approximate affinity of different industries for the two major modes can be determined from table 4. (ATA 63).

LABOUR

Labour is one of the basic factors of production, and scored high in all surveys. Although the surveys indicated the overwhelming importance of abundant labour, there was little done to distinguish the different types of labour needed for different industries.

Industrial management expects its labour force to have the following qualities:

a) abundance
b) adaptability
c) skill

Labour expects:

a) good pay
b) a safe place to work
c) room for personal advancement and improvement.

The degree of co-operation or antagonism between labour and management is determined largely by the degree of fulfillment of these expectations.

High general levels of wages are sometimes considered as a negative factor. (ECBC 68.) Although every industry requires a certain number of skilled key workers, this number varies considerably with the type of industry and stage of manufacture. Generally, the higher the value of the product and the more complex the process, the larger and more skilled labour force is required. (Dienes 69, Miller 70.) Skilled and semi-skilled labour is an absolute pre-requisite for manufacturing of all kinds of machinery, office equipment, electrical and communications equipment, aircraft, scientific instruments, and certain chemicals. Most large establishments train their own workers, but smaller establishments rely on outside training, i.e. their skilled workers come from other establishments, and from vocational training schools.

A large female labour force is required in the manufacture of electronic equipment, radio and TV receivers, stereos, leather goods, textile and food industries. (Britton 67)

IMPLICATIONS FOR NORTH PICKERING

Two groupings of industries, the machinery industries and parts of the chemical industry, are potentially of special interest, both in the development of North Pickering and as a contribution to the development of the eastern sub-region. Consequently, their particular location requirements are dealt with separately in the next two sections and the suitability of North Pickering as a location for them is discussed.

PARTICULAR REQUIREMENTS OF MACHINERY INDUSTRIES

The machinery industry is the backbone of the modern economy. Availability of markets and abundance of skilled labour are major factors in the localization of the machinery industry.

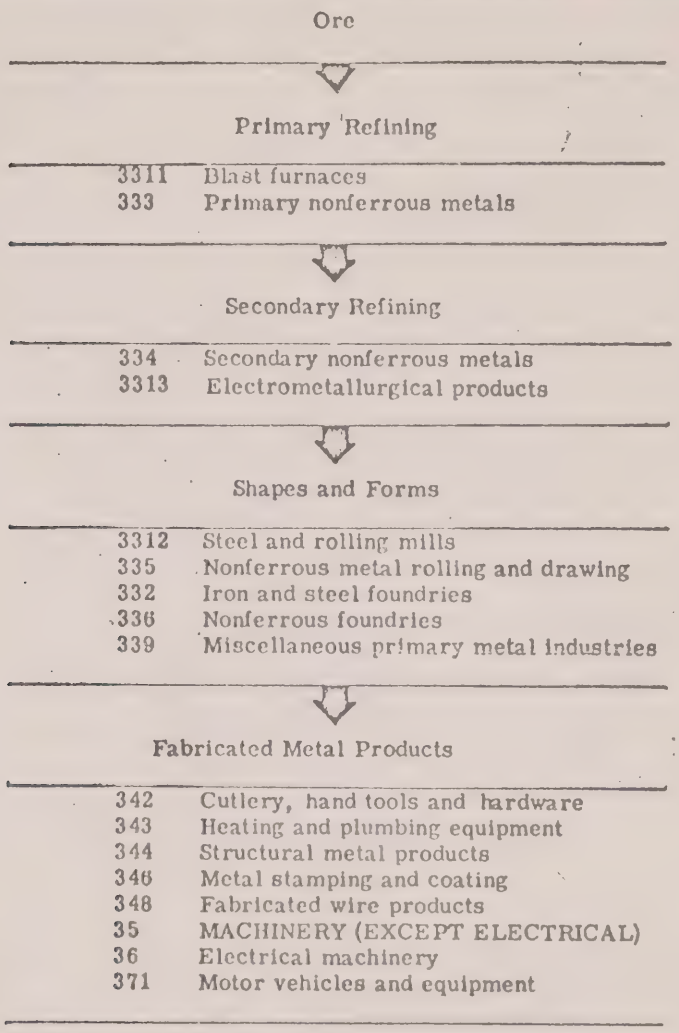
Transport costs for machinery are high due to their bulk, fragility and high value. A finished industrial machine will be from 2 to 10 times the bulk of its initial raw materials, and will have value 5 to 20 times greater, frequently even more. Therefore, because transport costs are considerably lower on raw materials, manufacturers tend to locate near their largest market (Miller 70).

Most of the machinery producing areas are near metal producing regions, particularly steel. At the same time it must be recognized that the machine consuming areas are closely allied to the machinery and steel producing areas. (Miller 70.) North Pickering can be considered as well located within the southern Ontario industrial complex, which is both a machine-producing and a machine-consuming area. (NPP 74.) (Fig.1)

Closely associated with machinery industry is the machine tool industry (SIC 315). Machine tools are used in all metal fabricating industries. Machine tools make possible the production of interchangeable parts which are the basis for mass production. The principal machine tools are lathes, drills, presses, planners, shapers, boring machines, and others.

The market for machine tools exerts considerable pressure on the location choices of the machine tool industry. A machine tool company must be sharply aware of the changing needs of its customers and often it satisfies needs of a particular company. Its size is frequently quite small.

FIG. I A PRODUCTION SEQUENCE IN METAL-PRODUCTS MANUFACTURING



IIa. The occurrence of Industry Group 35 will vary directly with the occurrence of each of these Industry Groups: (a) 332, Iron and steel foundries, (b) 335, Nonferrous rolling and drawing, (c) 336, Nonferrous foundries, (d) 339, Miscellaneous primary metal industries, (e) 342, Cutlery, hand tools and hardware, (f) 343, Heating and plumbing equipment, (g) 344, Structural metal products, (h) 346, Metal stamping and coating, (i) 348, Fabricated wire products, (j) 36, Electrical machinery and (k) 371, Motor vehicles and equipment.

Source: McCarty, Hook, Knos, "The Measurements of Association in Industrial Geography", Department of Geography, State University of Iowa, 1969.

Machinery industries (Standard Industrial Classification [SIC] Division 5, major group 14) is an extremely diversified group. It consists of four main classes:

1) SIC 311 Agricultural Implement Industry.
2) SIC 315 Miscellaneous Machinery and Equipment Manufacturers.
3) SIC 316 Commercial Refrigeration and Air Conditioning Manufacturers.
4) SIC 318 Office and Store Machinery Manufacturers.

Each main class contains literally hundreds of various machines used in every sector of the economy.

SIC 315 Engines, turbines and generators, both steam and diesel, require high capital.

SIC 318 Office Machines, such as typewriters, cash registers, copiers, duplicators, etc. are strongly market oriented. Because of budget considerations and close tolerances, most companies make their own parts. (A direct contrast with the automotive industry where subcontracting is a common practice). (Miller 70.)

Because essentially no automatic assembly or mass production is possible in machinery industry, large quantities of skilled labour are required.

Labour considerations are of all pervading importance. Labour costs represent between 35 to 65% of the total cost of machinery, and can be as high as 60 to 70% for office machines and 70 to 80% in the machine tool industry (Miller 70).

A shortage of skilled labour could seriously hamper the chances of engineering or machinery building industry locating in North Pickering.

On the other hand, different types of machinery production are frequently located in the same area (Bergman 73), recognizing the fact that they all can draw from the common pool of labour in the region (Miller 70).

The highly skilled and highly paid labour engaged in machinery industries does not migrate readily. The higher the skill of labour, the greater the emotional stability. (Miller 70). Systematically, it can be expressed as:

HIGHER SKILL → HIGHER WAGE → HIGHER LOCATION STABILITY
HIGHER SKILL → HIGHER PRODUCTIVITY → HIGHER CORPORATE INCOME

Since the location is suitable, it might be desirable to seek to establish a "complex" of related machinery industries in North Pickering, both as a contribution to the development and stability of the town's economic base, and as an assist to the economic development of the eastern sub-region.

PARTICULAR REQUIREMENTS OF CHEMICAL INDUSTRY

The chemical industry is characterized by technological innovations probably to a greater degree than any other industry save modern electronics.

In the North Pickering setting, only those branches of the chemical industry will be considered which will not interfere with the ecological balance of the site, and whose water, power, waste disposal and similar requirements will not exceed the capacities of the industrial parks. Consequently, polymerizing or compounding plants for example, will probably prove unsuitable in North Pickering.

On the other hand, processing, fabricating and finishing of plastics will perhaps be easiest to picture there. See figures 2, 3. Unlike the heavy inorganic branches of the chemical industry, the synthetic material industries use mostly products of sophisticated physical and chemical process. These are derived from petroleum, natural gas and coal at refineries, gas processing plants and coking centres. Certain fractions of refinery gas such as propylene and butylene (but not ethylene) can be separated and easily liquified, and shipped. Thus industries using these gases as raw material can locate practically anywhere. (Isard 55).

In the case of petrochemicals from crude oil, distillate stocks and LPG (liquid propane and butane), there exists the possibility of location near the market, since these raw materials can also be easily shipped by rail, ship or pipeline. At present, mobile petroleum raw materials afford the greatest locational flexibility. (Isard 55, Dienes 69).

FIG. 2 FLOWSHEET OF PRINCIPAL PETROCHEMICAL RAW MATERIALS, INTERMEDIATES, AND END PRODUCTS

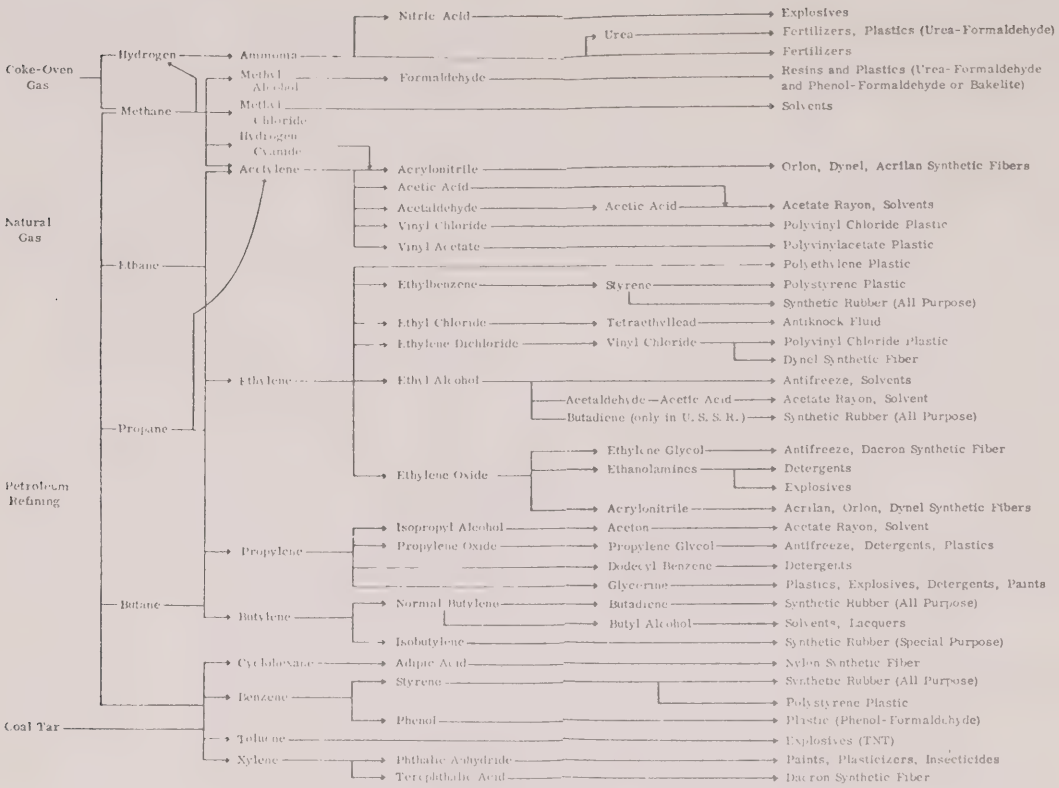


FIG. 3 STAGES IN PLASTICS MANUFACTURING

Stage	*Basic Chemicals*	*Monomers*	*Polymerization*	*Compounding*	*Processing*	*Fabricating*	*Finishing*
Activities:	Petroleum is converted to *petrochemicals* such as: ethylene, benzene, propylene, acetylene.	Petrochemicals plus other chemicals are converted into *monomers* such as: ethylene, vinyl chloride, acrylonitrile, styrene, propylene	One or more monomers are polymerized to form *polymers* or copolymers such as polyethylene polyvinyl chloride styrene acrylonitrile butadiene, copolymer (ABS) polystyrene polypropylene	Plasticizers, stabilizers, color pigments, antioxidants, inhibitors, and other chemicals are sometimes added to the base polymers to form *compounds* suitable for use by processors or as coatings for paper, wood, etc., or in paints and adhesives	The plastics *compounds* are *formed* into a variety of solid shapes such as sheets, tubes, rods, film, and other shapes, by the heat and/or pressure of casting, molding extrusion, or other means of processing. This step may provide a a finished product, such as plastic pipe	These solid shapes may be *fabricated* by thermoforming, machining, etc. to create plastics articles such as toys or appliances.	In some cases there is a *finishing* step, such as the printing of surface designs on vinyl film.

Sources: Fig.2 - Dienes, L., "Locational Factors and Locational Developments in the Soviet Chemical Industry", University of Kansas, 1969.

Fig.3 - Skinner, W., Rogers, D., "Manufacturing Policy in the Plastics Industry", R.A. Irwin Inc., Homewood, Illinois, 1968.

The chemical industry consumes energy in the form of steam, process heat and electricity. The share of thermal energy is considerably larger than that of electic power. As a whole, the chemical industry is not very energy oriented with the exception of the manufacture of industrial chemicals (Dienes 69, TFIGA 74).

The various branches of the chemical industry differ widely in their labour requirements. Labour costs as a percentage of the total cost vary from a high 50% for mineral products to 25% for synthetic fibers to 20% for thermosetting goods (Dienes 69). These figures indicate clearly that the end processes of the chemical industry tend to be more capital intensive. Another generalization to be introduced here is the observation that the higher the manufacturing stage, the less energy and raw material is consumed, while the cost of labour rises (Dienes 69).

Quantity and type of water varies for different sectors of chemical industry. See table 5. In particular, the quantity of water available in North Pickering will have to be taken into consideration if a large integrated firm decides to locate there. There is a trend toward forward integration of resin producers by acquisition of processors (Skinner 68).
This might be a basis for a chemical complex in North Pickering.

TABLE 5

WATER CONSUMPTION OF INDUSTRIES SURVEYED *

INDUSTRY	CANADIAN S.I.C.	WATER INTAKE PER EMPLOYEE FOR CANADIAN INDUSTRIES (MILLION GALLONS PER EMPLOYEE PER YEAR)	RANKED BY WATER INTAKE	US RANK (1)	ASSUMED CLASSIFICATION	ASSUMED INTAKE PER EMPLOYEE PER DAY (GALLONS)
Asphalt Roofing	272	0.517	1	H	Very High (Over 500,000 Gallons Per Year)	Over 2,000
Meat Products	101	0.444	2	H		
Brewers	145	0.439	3	H		
Tire and Tube Manufacturing	163	0.353	5	H		
Leather Tanneries	172	0.284	6	H	High (100,000 to 500,000 Gallons Per Year)	400 to 2,000
Concrete Products	347	0.218	7	H		
Dairy Products	105	0.161	8	H		
Soft Drinks	141	0.12	9	H		
Steel Pipe and Tube Manufacturing	292	0.117	10	H		
Paint and Varnish	375	0.114	11	H		
Metal Stamping and Pressing	304	0.113	12	VH		
Ready-Mix Concrete	348	0.107	13	H		
Hardware Tool and Cutlery	306	0.105	14	M		
Miscellaneous Manufacturing Industries	399	0.103	15	H		
Fabricated Plastic Products	385	0.092	16	M		
Heating Equipment	307	0.09	17	L		
Tobacco Products	153	0.07	18	L	Medium (25,000 to 99,000 Gallons Per Year).	100 to 399
Boiler and Plate Works	301	0.059	19	M		
Manufacturing of Major Appliances	332	0.059	20	H		
Other Paper Converters	274	0.058	21	L		
Manufacture of Industrial Electrical Equipment	336	0.057	22	M		
Wire and Wire Products	305	0.052	23	H		
Soap and Cleaning Products	376	0.049	24	M		
Iron Foundries	294	0.043	25	H		
Copper and Alloy Rolling	297	0.031	26	H		
Manufacture of Pharmaceutical Products	374	0.025	27	L		
Scientific and Professional Equipment	381	0.025	28	L		
Miscellaneous Metal Fabricated Products	309	0.023	29	-	Low (Less than 25,000 Gallons Per Year)	Less than 100
Engraving	287	0.023	30	L		
Toilet Preparations	377	0.017	31	M		
Miscellaneous Manufacturing Equipment	315	0.016	32	-		
Printing and Publishing	287	0.014	33	-		
Other Chemical Industries	379	0.006	34	M		
Paper Box and Bag Products	773	0.004	35	M		
Manufacture of Major Electrical Products	339	0.003	36	L		

(1) VH = Very High, H = High, M = Medium, L = Low } Consumption Rate Per Employee

* Source: Ontario Ministry of the Environment, Water Management Branch

Kates, Peat, Marwick & Co.

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APPENDIX TO PART III

Reproduced here in its entirety is Appendix A from the following source:

"Highways, Trucks and New Industry", American Trucking Association, Washington, D.C., 1963.

APPENDIX A RANKING OF PLANT LOCATION FACTORS BY MAJOR INDUSTRY GROUPS

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS FOR ALL SURVEY RESPONDENTS

TABLE A-1—ALL SURVEY RESPONDENTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	958
Abundant labor supply	2	827
Availability of suitable land	3	820
Proximity to markets	4	783
Availability of rail service	5	548
Availability of raw materials	6	428
Favorable tax structure (state or local)	7	400
Favorable leasing or financing	8	385
Abundant water supply	9	279
Proximity of related industry	10	273
Existence of building at site	11	257
Community's cultural-recreational assets	12	124
Nearby vocational training facilities	13	47

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-2—SIC GROUP NO. 20—FOOD AND KINDRED PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	74
Abundant labor supply	5	50
Availability of suitable land	3	64
Proximity to markets	1	80
Availability of rail service	6	43
Availability of raw materials	4	57
Favorable tax structure (state or local)	9*	18
Favorable leasing or financing	8	21
Abundant water supply	7	37
Proximity of related industry	11	15
Existence of building at site	9*	18
Community's cultural-recreational assets	12	1
Nearby vocational training facilities	13	0

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-3—SIC GROUP NO. 22—TEXTILE MILL PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	35
Abundant labor supply	1	45
Availability of suitable land	3	24
Proximity to markets	5*	17
Availability of rail service	11	0
Availability of raw materials	5*	17
Favorable tax structure (state or local)	8	15
Favorable leasing or financing	4	20
Abundant water supply	10	11
Proximity of related industry	8	16
Existence of building at site	5*	17
Community's cultural-recreational assets	12	4
Nearby vocational training facilities	13	2

* Tied

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-4—SIC GROUP NO. 23—APPAREL

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	46
Abundant labor supply	1	61
Availability of suitable land	5	26
Proximity to markets	7	19
Availability of rail service	11	5
Availability of raw materials	9	9
Favorable tax structure (state or local)	6	21
Favorable leasing or financing	3	40
Abundant water supply	12	5
Proximity of related industry	8	12
Existence of building at site	4	30
Community's cultural recreational assets	13	3
Nearby vocational training facilities	10	7

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-5—SIC GROUP NO. 24—WOOD AND LUMBER PRODUCTS OTHER THAN FURNITURE

Factor	Rank	Frequency-of-mention
Proximity to good highways	6	19
Abundant labor supply	3	21
Availability of suitable land	4*	20
Proximity to markets	4*	20
Availability of rail service	1*	26
Availability of raw materials	1*	26
Favorable tax structure (state or local)	7	9
Favorable leasing or financing	11	5
Abundant water supply	8	8
Proximity of related industry	9*	6
Existence of building at site	9*	6
Community's cultural-recreational assets	12	3
Nearby vocational training facilities	13	1

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-6—SIC GROUP NO. 25—FURNITURE AND FIXTURES

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	32
Abundant labor supply	2	31
Availability of suitable land	3*	24
Proximity to markets	3*	24
Availability of rail service	5	20
Availability of raw materials	6	15
Favorable tax structure (state or local)	8	12
Favorable leasing or financing	7	14
Abundant water supply	10	9
Proximity of related industry	11	5
Existence of building at site	9	10
Community's cultural-recreational assets	12	4
Nearby vocational training facilities	13	1

* Tied

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-7—SIC GROUP NO. 26—PAPER AND ALLIED PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	5	35
Abundant labor supply	1	40
Availability of suitable land	2	39
Proximity to markets	3*	38
Availability of rail service	3*	38
Availability of raw materials	6	16
Favorable tax structure (state or local)	8*	13
Favorable leasing or financing	7	14
Abundant water supply	8*	13
Proximity of related industry	10	9
Existence of building at site	11	7
Community's cultural-recreational assets	12	4
Nearby vocational training facilities	13	0

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-8—SIC GROUP NO. 27—PRINTING, PUBLISHING AND ALLIED INDUSTRIES

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	28
Abundant labor supply	3	17
Availability of suitable land	2	21
Proximity to markets	4	15
Availability of rail service	5	12
Availability of raw materials	11*	2
Favorable tax structure (state or local)	6*	8
Favorable leasing or financing	8	7
Abundant water supply	13	0
Proximity of related industry	9	4
Existence of building at site	10	3
Community's cultural-recreational assets	6*	8
Nearby vocational training facilities	11*	2

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-9—SIC GROUP NO. 28—CHEMICALS AND ALLIED PRODUCTS, (INCLUDING PLASTICS AND DRUGS)

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	105
Abundant labor supply	5	71
Availability of suitable land	2	101
Proximity to markets	3	99
Availability of rail service	4	94
Availability of raw materials	7	63
Favorable tax structure (state or local)	8	45
Favorable leasing or financing	11	23
Abundant water supply	6	64
Proximity of related industry	9	36
Existence of building at site	10	25
Community's cultural-recreational assets	12	7
Nearby vocational training facilities	13	3

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-10—SIC GROUP NO. 29—PETROLEUM REFINING AND RELATED INDUSTRY

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	16
Abundant labor supply	7	6
Availability of suitable land	2	14
Proximity to markets	3	12
Availability of rail service	5	9
Availability of raw materials	4	11
Favorable tax structure (state or local)	10*	1
Favorable leasing or financing	10*	1
Abundant water supply	6	8
Proximity of related industry	8	4
Existence of building at site	9	2
Community's cultural-recreational assets	10*	1
Nearby vocational training facilities	10*	1

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-11—SIC GROUP NO. 30—RUBBER AND MISCELLANEOUS PLASTICS PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	1*	25
Abundant labor supply	1*	25
Availability of suitable land	4	20
Proximity to markets	3	23
Availability of rail service	9	9
Availability of raw materials	12*	0
Favorable tax structure (state or local)	7*	11
Favorable leasing or financing	5*	13
Abundant water supply	5*	13
Proximity of related industry	10	5
Existence of building at site	7*	11
Community's cultural-recreational assets	11	1
Nearby vocational training facilities	12*	0

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-12—SIC GROUP NO. 31—LEATHER AND LEATHER PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	16
Abundant labor supply	1	19
Availability of suitable land	5	9
Proximity to markets	6	7
Availability of rail service	8*	4
Availability of raw materials	10	3
Favorable tax structure (state or local)	4	10
Favorable leasing or financing	3	14
Abundant water supply	8*	4
Proximity of related industry	11*	2
Existence of building at site	7	6
Community's cultural-recreational assets	11*	2
Nearby vocational training facilities	13	0

* Tied

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-13—SIC GROUP NO. 32—STONE, CLAY, AND GLASS PRODUCTS

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	56
Abundant labor supply	5	41
Availability of suitable land	6	35
Proximity to markets	1	61
Availability of rail service	4	45
Availability of raw materials	3	53
Favorable tax structure (state or local)	8	14
Favorable leasing or financing	9	12
Abundant water supply	7	17
Proximity of related industry	10	10
Existence of building at site	11	5
Community's cultural-recreational assets	12	3
Nearby vocational training facilities	13	1

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-14—SIC GROUP NO. 33—PRIMARY METALS INDUSTRY

Factor	Rank	Frequency-of-mention
Proximity to good highways	3*	29
Abundant labor supply	2	30
Availability of suitable land	1	33
Proximity to markets	3*	29
Availability of rail service	5	19
Availability of raw materials	7	13
Favorable tax structure (state or local)	6	17
Favorable leasing or financing	10	8
Abundant water supply	8	11
Proximity of related industry	9	9
Existence of building at site	11	6
Community's cultural-recreational assets	12	4
Nearby vocational training facilities	13	1

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-15—SIC GROUP NO. 34—FABRICATED METAL PRODUCTS, EXCEPT ORDNANCE, MACHINERY AND TRANSPORTATION EQUIPMENT

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	102
Abundant labor supply	2	83
Availability of suitable land	4	72
Proximity to markets	3	75
Availability of rail service	5	54
Availability of raw materials	9	29
Favorable tax structure (state or local)	6	52
Favorable leasing or financing	7	46
Abundant water supply	10	17
Proximity of related industry	11	14
Existence of building at site	8	30
Community's cultural recreational assets	12	7
Nearby vocational training facilities	13	2

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-16—SIC GROUP NO. 35—MACHINERY, EXCEPT ELECTRICAL

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	88
Abundant labor supply	2*	74
Availability of suitable land	2*	74
Proximity to markets	4	61
Availability of rail service	7*	32
Availability of raw materials	6	36
Favorable tax structure (state or local)	5	40
Favorable leasing or financing	7*	32
Abundant water supply	12	8
Proximity of related industry	9	23
Existence of building at site	10	22
Community's cultural-recreational assets	11	15
Nearby vocational training facilities	13	2

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-17—SIC GROUP NO. 36—ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	63
Abundant labor supply	1	79
Availability of suitable land	3	62
Proximity to markets	4	40
Availability of rail service	11	17
Availability of raw materials	8	19
Favorable tax structure (state or local)	5	34
Favorable leasing or financing	6	32
Abundant water supply	12	16
Proximity of related industry	7	24
Existence of building at site	9*	18
Community's cultural-recreational assets	9*	18
Nearby vocational training facilities	13	12

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-18—SIC GROUP NO. 37—TRANSPORTATION EQUIPMENT

Factor	Rank	Frequency-of-mention
Proximity to good highways	1*	44
Abundant labor supply	1*	44
Availability of suitable land	4	37
Proximity to markets	3	42
Availability of rail service	6*	23
Availability of raw materials	11	10
Favorable tax structure (state or local)	5	26
Favorable leasing or financing	6*	23
Abundant water supply	12*	1
Proximity of related industry	9	15
Existence of building at site	8	17
Community's cultural-recreational assets	10	11
Nearby vocational training facilities	12*	1

* Tied

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-19—SIC GROUP NO. 38—PROFESSIONAL, SCIENTIFIC AND CONTROLLING INSTRUMENTS; PHOTOGRAPHIC AND OPTICAL GOODS

Factor	Rank	Frequency-of-mention
Proximity to good highways	4	9
Abundant labor supply	1*	13
Availability of suitable land	1*	13
Proximity to markets	3	11
Availability of rail service	7*	5
Availability of raw materials	10	4
Favorable tax structure (state or local)	7*	5
Favorable leasing or financing	5	7
Abundant water supply	11*	1
Proximity of related industry	7*	5
Existence of building at site	13	0
Community's cultural-recreational assets	6	6
Nearby vocational training facilities	11*	1

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-20—SIC GROUP NO. 39—MISCELLANEOUS MANUFACTURING INDUSTRIES

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	16
Abundant labor supply	2	14
Availability of suitable land	5	9
Proximity to markets	3	11
Availability of rail service	6	6
Availability of raw materials	9*	3
Favorable tax structure (state or local)	7*	5
Favorable leasing or financing	4	10
Abundant water supply	13	1
Proximity of related industry	9*	3
Existence of building at site	9*	3
Community's cultural-recreational assets	7*	5
Nearby vocational training facilities	12	2

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-21—SIC GROUP NO. 42—MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING (IN SURVEY BECAUSE OF WAREHOUSING)

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	21
Abundant labor supply	6	11
Availability of suitable land	1	24
Proximity to markets	3	18
Availability of rail service	4	14
Availability of raw materials	9	6
Favorable tax structure (state or local)	8	7
Favorable leasing or financing	7	8
Abundant water supply	10	4
Proximity of related industry	5	12
Existence of building at site	11*	2
Community's cultural-recreational assets	11*	2
Nearby vocational training facilities	13	0

* Tied

APPENDIX A

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-22—SIC GROUP NO. 50—WHOLESALE TRADE, ON SURVEY BECAUSE OF DISTRIBUTION CENTERS)

Factor	Rank	Frequency-of-mention
Proximity to good highways	1	51
Abundant labor supply	5	20
Availability of suitable land	3	38
Proximity to markets	2	44
Availability of rail service	4	33
Availability of raw materials	9	8
Favorable tax structure (state or local)	8	12
Favorable leasing or financing	7	13
Abundant water supply	11	5
Proximity of related industry	6	15
Existence of building at site	10	7
Community's cultural-recreational assets	12	3
Nearby vocational training facilities	13	0

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASIS BY MAJOR SIC GROUPS

TABLE A-23—SIC GROUP NO. 73—MISCELLANEOUS BUSINESS SERVICES, (IN SURVEY BECAUSE OF COMMERCIAL RESEARCH, DEVELOPMENT AND TESTING CENTERS)

Factor	Rank	Frequency-of-mention
Proximity to good highways	1*	11
Abundant labor supply	3	10
Availability of suitable land	1*	11
Proximity to markets	7*	5
Availability of rail service	7*	5
Availability of raw materials	13	3
Favorable tax structure (state or local)	5*	6
Favorable leasing or financing	4	8
Abundant water supply	12	4
Proximity of related industry	5*	6
Existence of building at site	7*	5
Community's cultural-recreational assets	7*	5
Nearby vocational training facilities	7*	5

* Tied

RANKING OF PLANT LOCATION FACTORS ON A FREQUENCY OF MENTION BASES

TABLE A-24—FOR SURVEY RESPONDENTS FALLING INTO SIC GROUPS ON WHICH SEPARATE ANALYSES WERE NOT MADE

Factor	Rank	Frequency-of-mention
Proximity to good highways	2	39
Abundant labor supply	6*	22
Availability of suitable land	1	49
Proximity to markets	3	32
Availability of rail service	4	29
Availability of raw materials	8	21
Favorable tax structure (state or local)	9	19
Favorable leasing or financing	10	14
Abundant water supply	6*	22
Proximity of related industry	5	23
Existence of building at site	11*	7
Community's cultural-recreational assets	11*	7
Nearby vocational training facilities	13	3

* Tied

Ministry of
Housing
Hon. Donald R. Irvine, *Minister*
R. M. Warren, *Deputy Minister*